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ABSTRACT

This bibliography identifies reports of research on the nature, effects, and relief of mathematics anxiety. The listing was developed for a synthesis of research performed by meta-analysis at Adrian College, Michigan. Guidelines for including studies were applied as follows: (1) the study provided product-moment correlation coefficients and their sample sizes or, in the case of experiments, sufficient data for effect-size calculations; (2) mathematics anxiety (MATHANX) measurements were made by validated instruments; (3) experiments used at least two groups, including a control; and (4) each experimental group contained at least 10 subjects. This screening delivered a body of 151 studies: 49 journal articles, 23 ERIC documents, 75 doctoral dissertations, and 4 reports in other sources. Studies are listed alphabetically by author in four categories: journal articles; ERIC documents; doctoral dissertations; and other sources. (Author/PK)

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BIBLIOGRAPHY OF RESEARCH ON MATHEMATICS ANXIETY

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Abstract

This bibliography identifies reports of research on the nature, effects, and relief of mathematics anxiety. The listing was developed for a synthesis of its research, performed by meta-analysis at Adrian College, Michigan, in 1987-1988. Guidelines for including studies were applied as follows: 1) the study report provided product-moment correlation coefficients and their sample sizes or, in the case of experiments, sufficient data for effect-size calculations; 2) mathematics anxiety (MATHANX) measurements were made by validated instruments; 3) experiments used at least two groups, including a control; and, 4) each experimental group contained at least 10 subjects. This screening delivered a body of 151 studies: 49 journal articles, 23 ERIC documents, 75 doctoral dissertations, and 4 reports in other sources. These studies are listed herein alphabetically by author in four categories: journal articles (pp. 4-8); ERIC documents (pp. 8-11); doctoral dissertations (pp. 11-19); and, other sources p. 19).

BIBLIOGRAPHY OF RESEARCH ON MATHEMATICS ANXIETY

Journal Articles

Aiken, L., Jr. (1963). Personality correlates of attitude toward mathematics. Journal of Educational Research, 56, 476-480.

Armstrong, J., & Price, R. (1982). Correlates and predictors of women's mathematics participation. Journal for Research in Mathematics Education, 13, 99-109.

Bander, R., & Betz, N. (1981). The relationship of sex and sex role to trait and situationally specific anxiety types. Journal of Research in Personality, 15, 312-322.

Bander, R., Russell, R., & Zamostny, K. (1982). A comparison of cue-controlled relaxation and study skills counseling in the treatment of mathematics anxiety. Journal of Educational Psychology, 74, 96-103.

Battista, M. (1986). The relationship of mathematics anxiety and mathematical knowledge to the learning of mathematical pedagogy by preservice elementary teachers. School Science and Mathematics, 86, 10-19.

Betz, N. (1978). Prevalence, distribution, and correlates of math anxiety in college students. Journal of Counseling Psychology, 25, 441-448.

Betz, N., & Hackett, G. (1983). The relationship of mathematics self-efficacy expectations to the selection of science-based college majors. Journal of Vocational Behavior, 23, 329-345.

Brassell, A., Petry, S., & Brooks, D. (1980). Ability grouping, mathematics achievement and attitudes toward mathematics. Journal for Research in Mathematics Education, 2, 22-28.

Brown, J. D. (1972). An evaluation of the Spitz Student Response System in teaching a course in logical and mathematical concepts. Journal of Experimental Education, 40(3), 12-20.

Brush, L. (1978). A validation study of the Mathematics Anxiety Rating Scale. Educational and Psychological Measurement, 38, 485-490.

Clute, P. (1984). Mathematics anxiety, instructional method, and achievement in a survey course in college mathematics. Journal for Research in Mathematics Education, 15, 50-58.

Dambrot, F., Watkins-Malek, M., Silling, S., Marshall, R., & Garver, J. (1985). Correlates of sex differences in attitudes toward and involvement with computers. Journal of Vocational Behavior, 27, 71-86.

Dew, K., Galassi, J., & Galassi, M. (1983). Mathematics anxiety: Some basic issues. Journal of Counseling Psychology, 30, 443-446.

Dew, K., Galassi, J., & Galassi, M. (1984). Math anxiety: Relation with situational test anxiety, performance, physiological arousal, and math avoidance behavior. Journal of Counseling Psychology, 31, 580-583.

Dreger, R., & Aiken, L., Jr. (1957). Identification of number anxiety in a college population. Journal of Educational Psychology, 47, 344-351.

Gayton, W., Hearns, J., Breed, L., & Ozmon, K. (1983). Anxiety about mathematics and anxieties toward the metric system. Psychological Reports, 53, 702.

Gliner, G. (1987). The relationship between mathematics anxiety and achievement variables. School Science and Mathematics, 87, 81-87.

Gressard, C., & Loyd, B. (1987). An investigation of the effects of math anxiety and sex on computer attitudes. School Science and Mathematics, 87, 125-135.

Hackett, G. (1985). Role of mathematics self-efficacy in the choice of math-related majors of college women and men: A path analysis. Journal of Counseling Psychology, 32, 47-56.

Hendel, D. (1980). Experiential and affective correlates of math anxiety in adult women. Psychology of Women Quarterly, 5, 219-230.

Hendel, D., & Davis, S. (1978). Effectiveness of an intervention strategy for reducing mathematics anxiety. Journal of Counseling Psychology, 25, 429-434.

Kelly, W., & Tomhave, W. (1985). A study of math anxiety/math avoidance in preservice elementary teachers. Arithmetic Teacher, 32(5), 51-53.

Kostka, M., & Wilson, C. (1986). Reducing mathematics anxiety in nontraditional-age female students. Journal of College Student Personnel, 27, 530-534.

Lindbeck, J., & Dambrot, F. (1986). Measurement and reduction of math and computer anxiety. School Science and Mathematics, 86, 567-577.

Llabre, M., & Suarez, E. (1985). Predicting math anxiety and course performance in college women and men. Journal of Counseling Psychology, 32, 283-287.

Mevarech, Z. (1985). Computer-assisted instructional methods: A factorial study within mathematics disadvantaged classrooms. Journal of Experimental Education, 54(1), 22-27.

Morris, L., Kelleway, D., & Smith, D. (1978). Mathematics Anxiety Rating Scale: Predicting anxiety experiences and academic performance in two groups of students. Journal of Educational Psychology, 70, 589-594.

Olson, A., & Gillingham, D. (1980). Systematic desensitization of mathematics anxiety among preservice elementary teachers. Alberta Journal of Educational Research, 26(2), 120-127.

Pedersen, K., Bleyer, R., & Elmore, P. (1985). Attitudes and career interests of junior high school mathematics students: Implications for the classroom. Arithmetic Teacher, 32(7), 45-49.

Pedersen, K., Elmore, P., & Bleyer, D. (1986). Parent attitudes and student career interests in junior high school. Journal for Research in Mathematics Education, 17, 49-59.

Pedro, J., Wolleat, P., Fennema, E., & Becker, A. (1981). Election of high school mathematics by females and males: Attributions and attitudes. American Educational Research Journal, 18, 207-218.

Plake, B., Ansorge, S., Parker, C., & Lowry, S. (1982). Effects of item arrangement, knowledge of arrangement, test anxiety and sex on performance. Journal of Educational Measurement, 19, 49-57.

Plake, B., & Parker, C. (1982). The development and validation of a revised version of the Mathematics Anxiety Rating Scale. Educational and Psychological Measurement, 42, 551-557.

Resnick, H., Viehe, J., & Segal, S. (1982). Is math anxiety a local phenomenon?--A study of prevalence and dimensionality. Journal of Counseling Psychology, 29, 39-47.

Richardson, F., & Suinn, R. (1972). The Mathematics Anxiety Rating Scale: Psychometric data. Journal of Counseling Psychology, 19, 551-554.

Richardson, F., & Suinn, R. (1973). A comparison of traditional systematic desensitization, accelerated massed desensitization, and anxiety management training in the treatment of mathematics anxiety. Behavior Therapy, 4, 212-218.

Rounds, J., Jr., & Hendel, D. (1980a). Measurement and dimensionality of mathematics anxiety. Journal of Counseling Psychology, 27, 138-149.

Rounds, J., Jr., & Hendel, D. (1980b). Mathematics anxiety and attitudes toward mathematics. Measurement and Evaluation in Guidance, 13, 83-89.

Sepie, A., & Keeling, B. (1978). The relationship between types of anxiety and underachievers in mathematics. Journal of Educational Research, 72(1), 15-19.

Siegel, R., Galassi, J., & Ware, W. (1985). A comparison of two models for predicting mathematics performance: Social learning versus math aptitude-anxiety. Journal of Counseling Psychology, 32, 531-538.

Sovchik, R., Meconi, L., & Steiner, E. (1981). Mathematics anxiety of preservice elementary mathematics methods students. School Science and Mathematics, 81, 643-648.

Suinn, R., Edie, C., Nicoletti, J., & Spinelli, P. (1972). The MARS, a measure of mathematics anxiety: Psychometric data. Journal of Clinical Psychology, 28, 373-375.

Suinn, R., Edie, C., & Spinelli, P. (1970). Accelerated massed desensitization: Innovation in short-term treatments. Behavior Therapy, 1, 303-311.

Suinn, R., & Edwards, R. (1982). The measurement of mathematics anxiety: The Mathematics Anxiety Rating Scale for Adolescents: MARS-A. Journal of Clinical Psychology, 38, 576-580.

Suinn, R., & Richardson, F. (1971). Anxiety management training: A nonspecific behavior therapy program for anxiety control. Behavior Therapy, 2, 498-510.

Szetela, W. (1973). The effects of test anxiety and success/failure on mathematics performance in Grade 8. Journal for Research in Mathematics Education, 4, 152-160.

Wilhelm, S., & Brooks, D. (1980). The relationship between pupil attitudes toward mathematics and parental attitudes toward mathematics. Educational Research Quarterly, 5(2), 8-15.

Wittig, M., Sasse, S., & Giacomi, J. (1984). Predictive validity of five cognitive skills tests among women receiving engineering training. Journal of Research in Science Teaching, 21, 537-546.

Wolfe, M. (1978). Anxiety and stereotyped beliefs about statistics. Evaluation and the Health Professions, 1(4), 251-260.

ERIC Documents

Alexander, L., & Cobb, R. (1984, November). Identification of the dimensions and predictors of math anxiety among college students. Paper presented at the annual meeting of the Mid-South Educational Research Association, New Orleans, LA. (ERIC Document Reproduction Service No. ED 251 320)

Amodeo, L., & Emslie, J. (1985, April). Effects of a mathematics intervention program on the computational skills and attitudes of preservice elementary and secondary teachers. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL. (ERIC Document Reproduction Service No. ED 270 247)

Armstrong, J. (1980). Achievement and participation of women in mathematics: An overview. Report of a two-year study. Denver, CO: Education Commission of the States, National Assessment of Educational Progress. (ERIC Document Reproduction Service No. ED 184 878)

Austin-Martin, G., Waddell, L., & Kincaid, M. (1980, October). Correlates of math anxiety in female college freshmen. Paper presented at the annual conference of the Rocky Mountain Educational Research Association, Las Cruces, NM. (ERIC Document Reproduction Service No. ED 194 351)

Bellando, J., & Winer, J. (1985, April). Computer anxiety: Relationship to math anxiety and Holland types. Paper presented at the annual convention of the Southwestern Psychological Association, Austin, TX. (ERIC Document Reproduction Service No. ED 258 089)

Betz, N. (1977, August). Math anxiety: What is it? Paper presented at the annual convention of the American Psychological Association, San Francisco, CA. (ERIC Document Reproduction Service No. ED 149 220)

Buckley, P., & Ribordy, S. (1982, May). Mathematics anxiety and the effects of evaluative instructions on math performance. Paper presented at the meeting of the Midwestern Psychological Association, Minneapolis, MN. (ERIC Document Reproduction Service No. ED 222 334)

Butler, M., & Austin-Martin, G. (1981, August). High-math-anxious female college freshmen: What do they have in common? Paper presented at the annual meeting of the American Psychological Association, Los Angeles, CA. (ERIC Document Reproduction Service No. ED 212 472)

Calvert, E. (1981). A study of the relationship between level of mathematics anxiety and sex, age, mathematical background and previous success in mathematics. Graduate seminar paper, Western Illinois University. (ERIC Document Reproduction Service No. ED 200 265)

Chapline, E., Newman, C., Denker, E., & Tittle, C. (1980). Teacher education and mathematics project. Final report. Flushing, NY: Queens College, City University of New York. (ERIC Document Reproduction Service No. ED 220 286)

Doyle, M., & Graesser, A. (1978, April). Mathematical problem spaces of the mathematically anxious and the mathematically comfortable. Paper presented at a meeting of the Western Psychological Association, San Francisco, CA. (ERIC Document Reproduction Service No. ED 162 899)

Elmore, P., & Vasu, E. (1979, April). Math anxiety: Its impact on graduate level statistics achievement. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA. (ERIC Document Reproduction Service No. ED 178 331)

Furuto, D., & Lang, M. (1982, March). Relationship of self-concept enhancement to anxiety and achievement in college mathematics. Paper presented at the annual meeting of the American Educational Research Association, New York. (ERIC Document Reproduction Service No. ED 218 088)

Heller, B., & D'Lugin, V. (1980). Project MART: Mathematics Anxiety Reduction Training. New York: Institute for Research and Development in Occupational Education, City University of New York. (ERIC Document Reproduction Service No. ED 196 708)

Hendel, D. (1977). The Math Anxiety Program: Its genesis and evaluation in continuing education for women. Minneapolis: University of Minnesota, Measurement Services Center. (ERIC Document Reproduction Service No. ED 156 727)

Kincaid, M., & Austin-Martin, G. (1981, January). Relationship between nath attitudes and achievement, parents' occupation, and math anxiety in female college freshmen. Paper presented at the annual meeting of the Southwest Educational Research Association, Dallas, TX. (ERIC Document Reproduction Service No. ED 199 105)

Meece, J. (1981, April). Sex differences in achievement-related affect. Paper presented at the annual meeting of the American Educational Research Association, Los Angeles, CA. (ERIC Document Reproduction Service No. ED 204 410)

Payton, J., & Loyd, B. (1984, October). Math attitudes and oomputer attitudes among college students. Paper presented at the annual meeting of the Northeastern Educational Research Association, Ellenville, NY. (ERIC Document Reproduction Service No. ED 253 433)

Shanklin, G. (1978). Escape from mathematics anxiety as a factor in major choice. Laramie: University of Wyoming, Academic Advisement Center. (ERIC Document Reproduction Service No. ED 204 681)

Sudweeks, R., Stoler, S., & Croker, M. (1980, April). Development of the Syracuse Mathematics Anxiety Scale. Paper presented at the annual meeting of the American Educational Research Association, Boston, MA. (ERIC Document Reproduction Service No. ED 186 266)

Teague, P., & Austin-Martin, G. (1981, February). Effects of a mathematics methods course on prospective elementary school teachers' math attitudes, math anxiety and teaching performance. Paper presented at the annual meeting of the Southwest Educational Research Association, Dallas, TX. (ERIC Document Reproduction Service No. ED 200 557)

Tittle, C., & Denker, E. (1981, April). Issues in the outcome evaluation of a math anxiety reduction program for teacher education students. Paper presented at the annual meeting of the American Educational Research Association, Los Angeles, CA. (ERIC Document Reproduction Service No. ED 202 826)

Wright, D., & Miller, L. (1981, November). Math anxiety: A research report. Paper presented at the annual meeting of the Mid-South Educational Research Association, Lexington, KY. (ERIC Document Reproduction Service No. ED 212 465)

Doctoral Dissertations

Aiken, L., Jr. (1961). Mathemaphobia and mathemaphilia: An analysis of personal and social factors affecting performance in mathematics (University of North Carolina at Chapel Hill, 1960). Dissertation Abstracts International, 21, 1992.

Ashenfelter, M. (1987). Reduction of math anxiety levels of students enrolled in elementary accounting. Dissertation Abstracts International, 47, 2859A. (University Microfilms No. 86-26,203)

Bennett, B. (1981). The relationship between mathematics anxiety and number pattern recognition in sixth grade students. Dissertation Abstracts International, 42, 2006A. (University Microfilms No. 81-24,378)

Benton, B. (1979). Math avoidance and the pursuit of fantasy careers (Southern Illinois University). Dissertation Abstracts International, 40, 2818B.

Blackwell, R. (1983). A comparison of think aloud and thought listing methods of cognitive assessment with math anxious college students (University of North Carolina at Chapel Hill). Dissertation Abstracts International, 44, 1228B.

Boodt, M. (1980). The nature of the relationship between anxiety toward mathematics and achievement in mathematics (Indiana University, 1979). Dissertation Abstracts International, 40, 5346A.

Brombach, C. (1980). The effects of systematic group desensitization and marathon group desensitization on mathematics anxiety and confidence in learning mathematics in freshmen college females (University of New Orleans). Dissertation Abstracts International, 41, 2445A.

Crumpton, S. (1978). A mathematical anxiety reduction project (University of Tennessee, 1977). Dissertation Abstracts International, 38, 5310A.

deBronac-Meade, M. (1981). Reduction of mathematics anxiety: A cognitive behavior modification approach (California School of Professional Psychology, 1980). Dissertation Abstracts International, 41, 3174B.

Deitch, I. (1981). Cognitive-behavioral treatment of mathematics anxiety in college women (Yeshiva University). Dissertation Abstracts International, 42, 1584B.

Delaney, R. (1980). An anecdotal and historical approach to mathematics (New York University). Dissertation Abstracts International, 41, 574A.

Denker, E. (1985). Evaluative and mathematics anxiety and the effects of metacognitive strategy training (City University of New York). Dissertation Abstracts International, 46, 1708B.

Donnelly, D. (1987). The effect of a high school computer studies course on achievement and anxiety level in mathematics (Northern Arizona University, 1986). Dissertation Abstracts International, 47, 2933A.

Drapac, G. (1981). Development of manipulative materials for elementary algebra for college students and evaluation of their effect on achievement, attitude toward mathematics, and math anxiety (University of Iowa, 1980). Dissertation Abstracts International, 42, 120A.

Druva, C. (1984). A comparison of the comprehension skills used in problem solving by math-anxious and non-math-anxious students enrolled in college-level mathematics courses (University of Minnesota). Dissertation Abstracts International, 45, 1341A.

Esposito, P. (1984). The effects of strategy games on measures of problem solving, mathematics anxiety, and logical reasoning on selected undergraduate elementary education majors (Temple University). Dissertation Abstracts International, 45, 79A.

Fee-Fulkerson, K. (1983). Cognitions and performance of high and low math anxious college men and women (University of North Carolina at Chapel Hill, 1982). Dissertation Abstracts International, 43, 3729B.

Fitzgerald, E. (1984). A personalized approach to mathematics anxiety reduction among college students (Arizona State University). Dissertation Abstracts International, 45, 1062A.

Freeman, C. (1982). The effect of a mathematics anxiety reduction model on the students in a college level basic mathematics skills course. Dissertation Abstracts International, 43, 1456A. (University Microfilms No. 82-23,666)

Frye, E. (1983). The effect of knowledge of level of mathematics basic skills on math anxiety (West Virginia University). Dissertation Abstracts International, 44, 1013A.

Furuto, D. (1981). A study of affective variables and performance in mathematics: The effects of systematic counseling upon student self-concept, anxiety, attitudes, and achievement (Brigham Young University). Dissertation Abstracts International, 42, 2546A.

Garcia, L. (1982). The treatment of mathophobia by means of reinterpretation of physiological arousal as a function of the level of perceived arousal (Fordham University). Dissertation Abstracts International, 43, 1652B.

Garfield, J. (1982). An investigation of factors influencing student attainment of statistical competence (University of Minnesota, 1981). Dissertation Abstracts International, 42, 5064A.

Gaskill, J. (1979). The emotional block in mathematics: A multivariate study (University of British Columbia, Canada). Dissertation Abstracts International, 40, 1931A.

Glass, G. (1982). A study of mathematics anxiety among female college students (Georgia State University). Dissertation Abstracts International, 43, 1867A.

Goodall, C. (1981). The reduction of mathematics anxiety utilizing relaxation and desensitization and the presentation of practical examples (University of South Florida, 1980). Dissertation Abstracts International, 41, 5012A.

Gourgey, A. (1983). The relationship of beliefs about mathematics, mathematical self-concept and arithmetic skills to mathematics anxiety and performance in basic statistics (New York University, 1982). Dissertation Abstracts International, 43, 2284A.

Green, J. (1986). Interventional strategies for the treatment of math anxiety. Dissertation Abstracts International, 47, 1245A. (University Microfilms No. 36-13,649)

Hadfield, O., III. (1986). Cognitive style and mathematics anxiety among high school students (Northern Arizona University). Dissertation Abstracts International, 47, 1590A.

Handler, B. (1983). Reduction of mathematics anxiety in college remedial algebra students (University of Tennessee, 1982). Dissertation Abstracts International, 44, 95A.

Harkins, R. (1981). The effect of mode of presentation on attitudes toward and achievement in mathematics (Indiana University, 1980). Dissertation Abstracts International, 41, 3930A.

Hyman, J. (1974). Systematic desensitization of mathematics anxiety in high school students: The role of mediating responses, imagery, emotionality, and expectancy. Dissertation Abstracts International, 34, 5680B. (University Microfilms No. 74-11,111)

Kitchens, A. (1980). An approach to relieving anxiety in the mathematics classroom (University of North Carolina, 1979). Dissertation Abstracts International, 40, 3743A.

Lavroff, W. (1980). The sex factor in the choice of academic majors as a function of mathematics anxiety (Georgia State University). Dissertation Abstracts International, 41, 960A.

Ling, J. (1983). A factor-analytic study of mathematics anxiety (Virginia Polytechnic Institute and State University, 1982). Dissertation Abstracts International, 43, 2266A.

Lipsett, T. (1987). The effects of two instructional interventions in mathematics anxiety on achievement of remedial college students (Fordham University, 1986). Dissertation Abstracts International, 47, 2494A.

Lowe, S. (1982). Relationships between math anxiety, test anxiety, and math performance (North Carolina State University). Dissertation Abstracts International, 43, 1403A.

Martel, H., & Mehallis, G. (1985). An analysis of a low-stress algebra class designed for "math anxious" community college students. Doctor of Education Practicum, Nova University. (ERIC Document Reproduction Service No. ED 260 914)

Martin, A. (1980). The effect of the use of the calculator on mathematics anxiety in college algebra students (University of Oklahoma). Dissertation Abstracts International, 41, 2485A.

Maysick, D. (1986). The relationship of self-concept, sex, age, major, anxiety, mathematics background, and mathematics ability to the level of mathematics and statistical anxiety among college juniors. Dissertation Abstracts International, 47, 86A. (University Microfilms No. 85-26,929)

McAuliffe, E. (1985). An investigation of preservice elementary teachers' mathematics anxiety and its relationship to their state-trait anxiety, attitudes toward mathematics, attitudes toward reading, test anxiety, and selected organic variables (Pennsylvania State University). Dissertation Abstracts International, 46, 1501A.

McTeer, P. (1983). Math anxiety: An intervention strategy to reduce math anxiety (Virginia Polytechnic Institute and State University, 1982). Dissertation Abstracts International, 43, 3249A.

Moore, C. (1980). Differential effects of arithmetic and reading abilities, field-dependence, and mathematics anxiety on problem solving achievement of developmental mathematics students in a community college (Virginia Polytechnic Institute and State University). Dissertation Abstracts International, 41, 974A.

Nash, P. (1970). Treatment of math anxiety through systematic desensitization and insight-oriented therapy groups. Dissertation Abstracts International, 31, 1018A. (University Microfilms No. 70-16,608)

Noone, E., Jr. (1977). A study of the effects of intellective and non-intellective variables upon final grade in freshman mathematics courses (University of Southern Mississippi). Dissertation Abstracts International, 38, 2526A.

Olson, J. (1986). Causes and correlates of mathematics anxiety and mathematics achievement: A path analytic approach (University of Nebraska, 1985). Dissertation Abstracts International, 46, 2975A.

Patrick, S. (1978). The association of mathematics anxiety with specific junior high and high school mathematics courses. Dissertation Abstracts International, 39, 11A. (University Microfilms No. 79-08,496)

Peavler, C. (1985). The relationship of mathematics anxiety to mathematics preparation and perceived adequacy of preparation of K-12 teachers of mathematics in the state of Texas (University of Houston). Dissertation Abstracts International, 46, 1601A.

Piggott, D. (1985). A relaxation and visualization program for mathematics anxiety. Dissertation Abstracts International, 45, 2021A. (University Microfilms No. 84-22,384)

Preston, P. (1987). Math anxiety: Relationship with sex, college major, mathematics background, mathematics achievement, mathematics performance, mathematics avoidance, self-rating of mathematics ability, and self-rating of mathematics anxiety as measured by the Revised Mathematics Anxiety Rating Scale (RMARS). Dissertation Abstracts International, 47, 2494A. (University Microfilms No. 86-24,261)

Probert, B. (1983). Math confidence workshops: A multimodel group intervention strategy in mathematics anxiety/avoidance. Dissertation Abstracts International, 44, 2231B. (University Microfilms No. 83-24,998)

Ramirez, O. (1986). Some factors related to mathematics anxiety among Hispanic college undergraduates (Texas A & M University, 1985). Dissertation Abstracts International, 46, 2954A.

Raub, A. (1982). Correlates of computer anxiety in college students (University of Pennsylvania, 1981). Dissertation Abstracts International, 42, 4775A. (University Microfilms No. 82-08,027)

Richardson, M. (1981). An assessment of mathematics anxiety levels among adult basic and adult secondary students (University of Georgia, 1980). Dissertation Abstracts International, 41, 4254A.

Richardson, S. (1981). Effectiveness of rational-emotive therapy or problem-solving/relaxation in reducing math anxiety and/or improving attitudes toward math in potential elementary school teachers (University of Wyoming, 1980). Dissertation Abstracts International, 41, 4340A.

Ridgeway, I. (1981). Elements of cognitive style, mathematics anxiety, and sex as they relate to achievement of high school chemistry students (Indiana University, 1980). Dissertation Abstracts International, 42, 161A.

Rosenberg, J. (1981). The ability of selected cognitive, affective, and educational variables to predict the presence of anxiety related to mathematics (University of Connecticut, 1980). Dissertation Abstracts International, 41, 3890A.

Sachs, S. (1982). A refinement of the relationship between examination performance and mathematics test anxiety. Doctor of Education Practicum, Nova University. (ERIC Document Reproduction Service No. ED 226 776)

Sandman, R. (1974). The development, validation, and application of a multidimensional mathematics attitude instrument (University of Minnesota, 1973). Dissertation Abstracts International, 34, 7054A-7055A.

Silcock, C. (1984). A comparison of high school females' attitudes toward mathematics in coeducational and all-girls private schools (Temple University, 1983). Dissertation Abstracts International, 44, 3643A.

Smith, T. (1983). The effects of a self-paced college algebra program on mathematics achievement and mathematics anxiety (Temple University). Dissertation Abstracts International, 44, 96A.

Smith, W. (1980). Treatments of mathematics anxiety: Anxiety management training, systematic desensitization, and self-help bibliotherapy. Dissertation Abstracts International, 40, 5800A. (University Microfilms No. 80-09,935)

Spungin, R. (1981). The relationship of mathematics anxiety and problem solving attitude to the problem solving performance of female prospective early childhood teachers. Dissertation Abstracts International, 41, 3932A. (University Microfilms No. 81-01,915)

Streim, L. (1980). A comparison of the relative efficacies of negative practice and anxiety management training in the treatment of math anxiety (Hofstra University, 1979). Dissertation Abstracts International, 40, 5025B.

Themes, E. (1983). Three methods of reducing math anxiety in women (Kent State University, 1982). Dissertation Abstracts International, 44, 97A.

Toliver, P. (1983). Effects of an anxiety management treatment on mathematics anxiety. Dissertation Abstracts International, 43, 2267A. (University Microfilms No. 82-27,730)

Trent, R. (1985). The effects of hypnotherapeutic restructuring, systematic desensitization and expectancy control on mathematics anxiety, attitude and performance in females and males (East Texas State University). Dissertation Abstracts International, 46, 1724B.

Troutman, J. (1978). The effects of a mathematics clinic on reducing anxiety in female students: Societal factors. Doctor of Education Practicum, Nova University. (ERIC Document Reproduction Service No. ED 156 538)

Turner, S. (1982). Encouraging women's participation in high school mathematics: An intervention study (University of South Florida). Dissertation Abstracts International, 43, 712A.

Urbatsch, T. (1980). An interaction study: Locus of control, mathematical attitude, mathematical anxiety, and mathematical achievement with three modes of instruction - Personalized system of instruction, traditional lecture and five day lecture (University of Iowa, 1979). Dissertation Abstracts International, 40, 6180A.

Voit, K. (1985). The effect of the use of math anxiety reduction techniques on the attrition rate of students in a community college algebra course (Temple University, 1983). Dissertation Abstracts International, 46, 920A.

Wachs, B. (1984). The mathematics anxieties and attitudes of urban public school teachers. Dissertation Abstracts International, 44, 3240A. (University Microfilms No. 84-04,993)

Waddell, L. (1983). Correlates of math anxiety in female college freshmen students: A predictive study. Dissertation Abstracts International, 43, 4132B. (University Microfilms No. 83-10,437)

Wahl, M. (1986). Mathematics anxiety in high school students: A study of gender and interrelated factors (University of Wisconsin-Milwaukee, 1985). Dissertation Abstracts International, 46, 2639A.

Williamson, E. (1981). Sex differences in causal attributions for success and failure and affective variables associated with mathematics avoidance/anxiety in a secondary school population. Dissertation Abstracts International, 42, 1524A. (University Microfilms No. 81-20,659)

Other Sources

Auslander, S. (1978). A statistical analysis of some undergraduate student attitudes toward mathematics. Master's thesis, Wesleyan University, Middletown, CT.

Brush, L. (1980). Encouraging girls in mathematics: The problem and the solution. Cambridge, MA: Abt Books.

Levitt, E., & Hutton, L. (1983). Correlates and possible causes of mathematics anxiety. In C. D. Spielberger & J. N. Butcher (Eds.), Advances in personality assessment, (Volume 3, pp. 129-149). Hillsdale, NJ: Erlbaum.

Oetting, E. (1983). Manual for Oetting's computer anxiety scale. Ft. Collins, CO: Rocky Mountain Behavioral Sciences Institute, Inc.

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